MFRP Project - Plastic-Wrap Preserved Mature Orchardgrass Round-Baled 'Hay' Up to 34% Moisture

by Krishona Martinson, Craig Sheaffer, University of Minnesota; Wayne Coblentz, U.S. Dairy Forage Research Center

Knowledge regarding the effects of moisture content at baling and the potential for plastic-wrap to preserve forage quality and minimize mold formation in round-baled orchardgrass 'hay' is important, particularly for horses. A Minnesota study investigated the effects of initial bale moisture and plastic wrapping on temperature, forage quality and mold formation in large round-baled orchardgrass hay.

Mature orchardgrass was baled into 40, 4'x 5'-round-bales at three different moisture ranges: 12-17%, 18-23% and 26-34%. Selected bales within each moisture range were individually wrapped in plastic and temperature sensors placed in each bale for 10 weeks.

Lowest maximum temperature and lowest heating-degree-day accumulation occurred when initial bale-moisture content was 12%; or when hay was wrapped, regardless of initial moisture content. Over two years, all wrapped 'hays' had similar forage quality and mold counts compared to hay round-baled at 12% moisture.

Orchardgrass-hay round-baled at 17% moisture had fiber and mold levels similar to higher moisture (18-34%, unwrapped) bales. Mold counts for hay round-baled at 17% vs. 12% moisture were 2,500,000 vs. 27,000 'colony-forming units' per gram, respectively (~100-fold difference); demonstrating that large round-bales were prone to molding at relatively low (17%) moisture levels. Round-baling dry hay at 12% moisture, or wrapping round-bales at up to 34% moisture maintained forage quality and reduced mold growth of mature orchardgrass 'hay'.

This project was funded by the MFA's Midwest Forage Research Program (MFRP).

Table 1. *Mold counts for mature orchardgrass round bales as influenced by initial moisture and plastic-wrapping during 2008 and 2009.*

Year & Treatment	Initial Bale Moisture	Mold Counts
2008	-----%-----	Colony-forming-units per gram
	17	24,800,000
	23	19,700,000
	30	5,500,000
	33	86,000
2009	-----%-----	Colony-forming-units per gram
Control (Low Moisture)	12	26,000
Intermediate Moisture	21	7,100,000
High Moisture	33	5,300,000
Control, Wrapped	12	51,000
Intermediate Moisture, Wrapped	18	19,000
High Moisture, Wrapped	26	260,000